Science Fair Engineering Design Report Format

Adapted from Electrical Engineering Program at The Milwaukee School of Engineering and Department of Mechanical Engineering University of Minnesota

Engineering Design Rubric

Section	Content
1. Title page	Key info and one illustration
2. Executive Summary	
3. Table of Contents	One - page summary of the project
4. Problem Statement - Problem Scope - Technical Review - Design Requirements	Introduces and defines the problem
5. Design Description - Overview - Detailed Description - Use	Describes the design
6. Evaluation - Overview - Prototype - Testing and Results - Subsection for each requirement - Assessment - Next Steps	Evaluates the design
7. Material Cost Brake Down	What you spend money on and price per unit
8. Project management timeline/ chart*	Gantt or PERT chart
9. Ethical Considerations*	
10. Safety*	
11. Conclusions	
12. Acknowledgments	
13. References	List of references used and cited
14. Appendices	All of the backup information, example code, etc.

* Optional for report/ display

The following format should be followed for a design report.

1. **Title Page:** The title of the design project is to be in the center of the page. Below it list the following items:
    a) Date:
    b) Course/Section:
    c) Instructor:
    d) Team Members:
2. **Executive Summary:**
    a) The purpose of the executive summary is to provide key information up-front, such that while reading the report, a reader has expectations that are fulfilled on a continuous basis. Key to a good Summary is the *first* sentence, which *must* contain the most essential information that you wish to convey.
    b) The summary is to be written as if the reader is totally uninformed about your project and is not necessarily going to read the report itself.
    c) It must include a short description of the project, the process and the results.
    d) The Executive Summary is to be one page or less with one figure maximum.
3. **Table of Contents:** Include section titles and page numbers.
4. **Problem Statement and objectives:** Give a clear and concise definition of the problem and the intended objectives. Outline the design constraints and cost implications.
    a) Include appropriate background on the project for the reader to be able to put the information provided in context.
    b) The final project objectives *must* also be presented in the form of a set of technical specifications.
5. **Detailed design description/ documentation:** Show all elements of your design including an explanation of
    a) Assumptions made, making sure to justify your design decisions.
    b) Function of the System
    c) Ability of meet Engineering Specifications
    d) Prototypes developed, their testing and results relative to Engineering Specifications
    e) Cost analysis
    f) Manufacturing processes used
    g) DFX results
    h) Human factors considered
    i) All diagrams, figures and tables should be accurately and clearly labeled with meaningful names and/or titles. When there are numerous pages of computer-generated data, it is preferable to put this information in an appendix with an explanation in the report narrative.
6. **Evaluation**
    Laboratory test plans and results for all portions of the system that you built and tested. Write a narrative description of test plan(s). Use tables, graphs, and wherever possible to show your results. Also, include a description of how you plan to test the final system, and any features you will include in the design to facilitate this testing.

This section forms the written record of the performance of your design against specifications.

7. **Bill of materials:** Parts costs include only those items included in the final design. A detailed bill of materials includes (if possible) manufacturer, part number, part description, supplier, quantity, and cost.
8. **Gantt or PERT chart:** Show a complete listing of the major tasks to be performed, a time schedule for completing them, and which team member has the primary responsibility (and who will be held accountable) for each task.
9. **Ethical Consideration:** Provide information on any ethical considerations that govern the product specifications you have developed or that need to be taken into account in potentially marketing the product.
10. **Safety:** Provide a statement of the safety consideration in your proposed design to the extent that is relevant.
11. **Conclusions:** Provide a reasoned listing of only the most significant results.
12. **Acknowledgments:** List individuals and/or companies that provided support in the way of equipment, advice, money, samples, etc.
13. **References:** Including books, technical journals, patents.
14. **Appendices:** As needed for the following types of information:
    a) Detailed computations and computer generated data.
    b) Manufacturers' specifications.
    c) Original laboratory data.

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